Special Feature

In today's environment, US forces have been called on to make numerous overseas deployments, many on short notice—using downsized Cold War legacy force and support structures—to meet a wide range of mission requirements associated with peacekeeping and humanitarian relief, while maintaining the capability to engage in major combat operations such as those associated with operations over Iraq, Serbia, and Afghanistan.

logistics challenges

Global Combat Support System: A Must for the Warfighting Commander

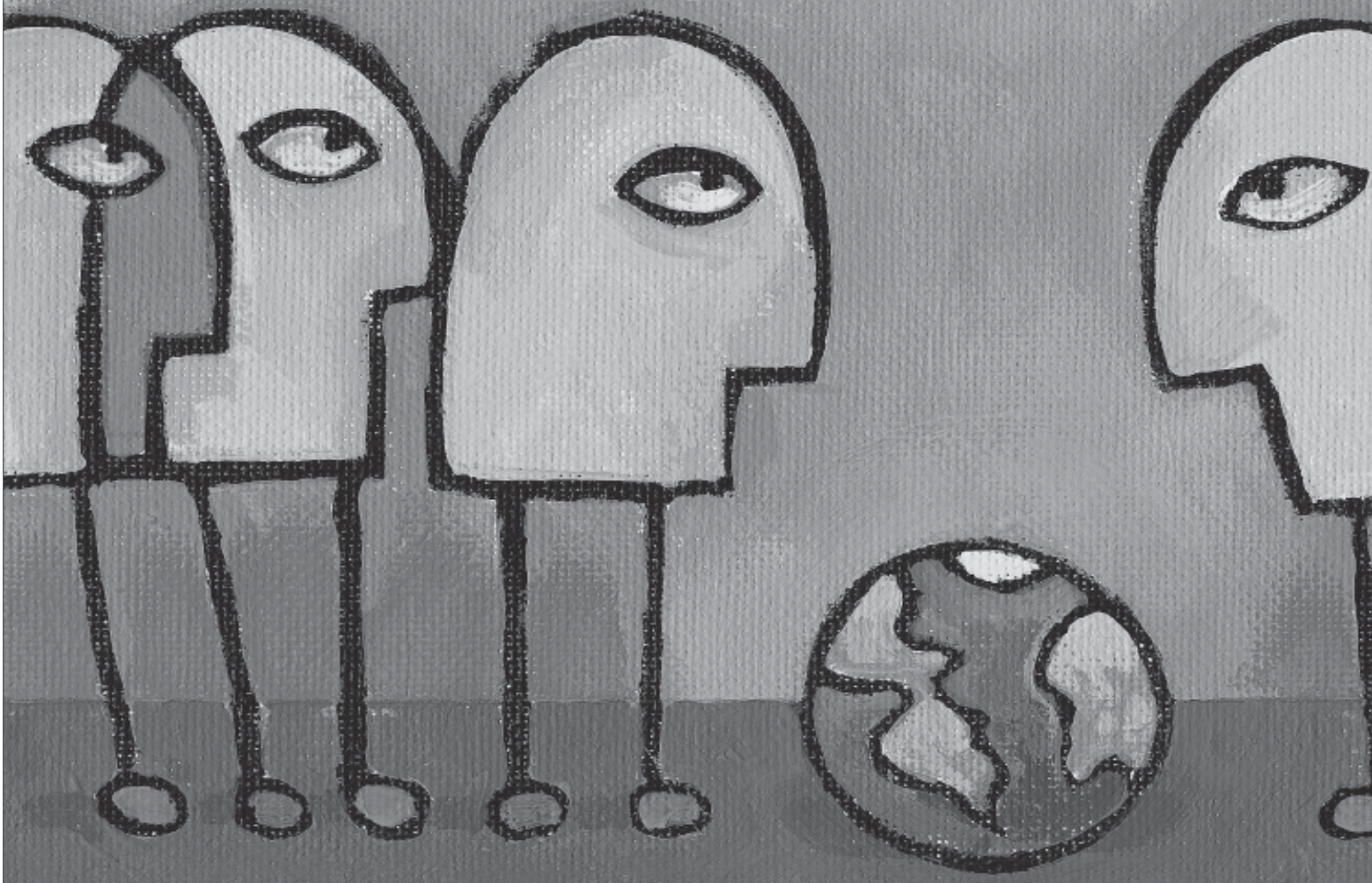
Contractors in Contingency Operations: Panacea or Pain

The dramatic increase in deployments from the continental United States, combined with the reduction of military resource levels, has increased the need for effective combat support. Because CS resources are heavy and constitute a large portion of the deployments, they have the potential to enable or constrain operational goals, particularly in today's environment, which is so dependent on rapid deployment. Central to solving the CS equation is streamlining CS deployment processes, leaning deployment packages, evaluating technologies that speed deployment, and the need for logistics management systems that keep pace with the evolving nature of war. Newkirk and Currie in "Global Combat Support System: A Must for the Warfighting Commander" argue for the need to link the network-centric warfare concept to logistics and for selection of a logistics management system that fully integrates requirements.

The history of contractor support for the US military can be traced to the Revolutionary War. Some level of contractor support has been a fact of life through all the major and minor conflicts of the 19th and 20th centuries. However, since the Vietnam conflict, contractors have been called on to perform work that directly supports military missions—work that increased their presence near or on the battlefield. This has led to significant issues—contractor status, service doctrine, contract versus organic capabilities, host-nation support contracts, and actual money and manpower savings. "In Contractors in Contingency Operations: Panacea or Pain?" Manker and Williams examine these issues and draw a variety of conclusions.

Global Combat Support System

A Must for the Joint Warfighting Commander



Based on lessons learned from military operations since Desert Storm and the asymmetric nature of future battlefields, DoD leaders have determined that a joint, network-centric warfare focus will guide the military's efforts to transform its forces.

Lieutenant Colonel Bryan T. Newkirk, USA
Colonel Karen W. Currie, USAF

Introduction

Special Feature

Providing the very best supply support to the joint warfighting commander requires that logisticians get the right supplies and equipment, in the right quantities, in the right condition, at the right place, at the right time.[1] Throughout the history of warfare, management systems that logisticians have used to provide the best supply support have changed and will continue to change. As a result of lessons learned from previous conflicts and continuous technological advances to improve warfighting capabilities in future wars, logisticians have been required to find new logistics management systems to keep pace with the evolving nature of war. Using logistics lessons learned from Operations Iraqi Freedom and the Department of Defense's (DoD) specific guidance for departments and agencies to develop network-centric systems for use on tomorrow's information age battlefield, logisticians can develop a reasonable list of required capabilities for the new supply management system that will be used to support the joint warfighting commander in the future. However, the current dilemma within the DoD logistics community is not identifying requirements for this future system but selecting a supply management system that best meets the requirements.

The Network-Centric Warfare Concept Applied to Logistics

Based on lessons learned from military operations since Desert Storm and the asymmetric nature of future battlefields, DoD leaders have determined that a joint, network-centric warfare focus will guide the military's efforts to transform its forces.[2]

What is this network-centric warfare concept, and what does it look like when applied to logistics? Network-centric warfare effectively links or networks geographically dispersed semidependent joint forces operating in an unpredictable environment against a sophisticated adversary who uses asymmetric strategies. This network provides each joint force with real-time, common, actionable, battlespace information. The real-time actionable information enables each force to reorient based on shared information, make decisions based on common goals, and then act at rates previously unattainable. Unlike raw information that must be analyzed before a commander can use it, this actionable information is analyzed already and tells commanders actions to take to best support the warfighter. Ultimately, network-centric warfare greatly reduces decisionmaking and execution time lines, resulting in increased flexibility, lethality, and speed for the warfighter.[3]

Given DoD's emphasis on transforming the US military into a network-centric warfare fighting force, the Office of the Secretary of Defense (OSD) has chartered the Office of Force Transformation (OFT) to take the lead with the transformation of the military. OFT has emphasized that network-centric operations incrementally integrated into the military will be coevolutionary. In other words, there must be a continuous development of mutually supporting strategies, concepts, processes, organizations, and technologies as the system is being fielded in DoD. Development will be based on feedback from the field and testing at designated experimentation sites.[4]

When applied to logistics, the network-centric concept produces a logistics concept that the OFT calls sense and respond logistics (S&RL).[5] This is a logistics concept in which current service, unit, and DoD agency materiel stovepipes are crossed, allowing the free flow of supplies among units, services, and supply depots. The S&RL or network-centric logistics concept provides a common global asset visibility picture to all users and commanders and automatically directs the most effective and efficient movement of supplies from anywhere within the global network to satisfy real-time demands. All units in the network are potential sources of supply to all other units. Additionally, the DoD's joint concepts document has mandated that the network-centric logistics concept be a joint endeavor that gives US forces the ability to fight, not as independent services relying on supplies within their stovepipes but as truly joint and interdependent forces that rely on and have access to supplies anywhere in the DoD enterprise.[6] Supplies are triggered on real-time demands, the operational scheme of maneuver, supply priorities, and parameters established by authorized commanders. The system is highly adaptive to support frequent changes in supply requirements.[7] It focuses on continually enhancing warfighting unit readiness, which requires that the logistics network-centric system have seamless and continuous interaction with the joint warfighter's operational and intelligence networks.[8] Interaction with these networks will have a direct effect on warfighting unit readiness and supply requirements information in the logistics domain. The OFT also has directed that network logistics systems be coevolutionary. This means that network-centric logistics component systems must be fielded incrementally in DoD and then immediately modified based on feedback from the field and designated experimentation sites. Additionally, the new logistics system must have all the following attributes:

- Take advantage of the best models by continually leveraging the capabilities of commercial and government technology.
- Be readily modified so that it always takes advantage of the latest technological developments and is interoperable with emerging DoD information network architecture.
- Be ready for immediate use in the DoD enterprise.[9]

In summary, the OFT has determined that the network-centric logistics or S&RL system must meet these four critical requirements:

- Provide a common global asset visibility picture of all materiel in the DoD network.
- Continuously recommend the most effective and efficient move of supplies from anywhere in the network to satisfy real-time demands.
- Establish common logistics objectives and direct supply and transportation units to release and move supplies based on those common objectives and recommendations in capability number two above.
- Be ready for immediate use and be easily modified so that it always leverages the best government and commercial technology.

The emerging DoD system that has potential to evolve and become the very best network-centric logistics enterprise for the Armed Forces is the Global Combat Support System (GCSS).

The Global Combat Support System

To develop one logistics asset visibility system that would meet user requirements across the DoD enterprise, OSD initiated the GCSS project in 1996. The GCSS operational concept that identified system capabilities, organizational support requirements, and the flow of information within the system was completed in 1997 and has been updated frequently since then. The Logistics Directorate of the Joint Staff (JSJ4) is responsible for GCSS architecture development. Various offices support the JSJ4 in its efforts to provide direction, priorities, contractor support, and oversight.[10]

When applied to logistics, the network-centric concept produces a logistics concept that the OFT calls sense and respond logistics.

Today, the Defense Information Support Agency (DISA) has fielded base models of GCSS in each of the geographic combatant commander's theaters. DISA's incremental fielding of modules with new capabilities gradually will enable GCSS to meet most of OFT's network-centric logistics requirements by 2006.[11] The current version of GCSS in the Central Command's (CENTCOM) theater during Iraqi Freedom allowed the CENTCOM Logistics Director (J4) to make prudent supply management decisions that joint staffs could not make because of the lack of asset visibility information. The CENTCOM J4 used the fielded capabilities of GCSS to get real-time location information on critical theater supplies that many assumed to be with the backlog of thousands of other items at Dover AFB, Delaware. He was not overly concerned with having the essential items in the theater because of the Total Asset Visibility and actionable decision information GCSS provided. GCSS ultimately enabled him to reduce the logistics footprint in the area of responsibility and avoid reordering critical items, which would have added to the congestion already in the logistics pipeline.[12] The asset visibility capability that GCSS gave the CENTCOM J4 is an integral part of the GCSS core capability, the ability to capture essential Total Asset Visibility logistics data and transform that data into usable information so DoD policy makers can make decisions that maximize the warfighter's readiness.[13]

The GCSS Concept

How, specifically, could GCSS build on the core capability described above to meet the OFT's requirements for network-centric logistics in the future? GCSS provides a centrally managed, open, Web-based information system in which the Services and DoD agencies operate and input logistics information into a GCSS family of systems (Figure 1, layer 3). The GCSS family of systems translates all raw data put in the network into usable GCSS information. The raw data from the Services and agencies include information from the transportation, supply, maintenance, personnel, acquisition, medical, finance, and engineering support domains (Figure 1, layer 4).

A Joint Asset Visibility and Joint Decision Support Tools server (Figure 1, layer 2) within the GCSS network then fuses and converts the information from the family of systems into real time, seamless, accurate, actionable, and common global asset visibility information for the user at the GCSS-combatant commander terminal (Figure 1, layer 1). With this construct, the GCSS-combatant commander or user at layer 1 has global access to logistics information—from each service component, defense agency, and the commercial sector—that spans across the strategic, operational, and tactical levels. Additionally, a classified suite of GCSS applications on the Secure Internet Protocol Network within layer 2 facilitates the fusion of logistics information with operational and intelligence information. The Joint Decision Support Tool (layer 2) translates this fused logistics, operational, and intelligence data into actionable information that enables joint decisionmakers to make timely and informed decisions to improve the readiness of the warfighter. Ultimately, authorized GCSS combatant commanders can access this shared data and its associated decisionmaking applications anywhere in the world.[14]

How GCSS Meets DoD's Network-Centric Logistics Requirement

With this basic understanding of the GCSS concept, one can now determine if GCSS capabilities meet the OFT's four critical requirements for the network-centric logistics system. The first critical OFT requirement for network-centric logistics is the provision of a common global asset visibility picture of all materiel within the DoD enterprise for authorized system users. GCSS meets this requirement by cutting across service component, unit, and DoD agency information stovepipes and reducing the overwhelming number of point-to-point connections that overload information flow to give authorized commanders and users real-time Total Asset Visibility. GCSS uses a single portal or server to serve as the second layer of the logistics management enterprise and integrate data from numerous family-of-systems logistics databases (Figure 1, layer 3) across DoD in a Web-based environment. Numerous legacy and disparate databases support and feed information into each of the individual family-of-systems databases.

For example, Air Force logistics databases, like the Information and Resources Support System, feed information into GCSS-Air Force (Figure 1, layer 3), and Army logistics databases, like the Standard Army Retail Supply System, feed information into GCSS-Army (Figure 1, layer 3). The majority of these support databases are controlled decentrally and managed by individual service components and department agencies, making it critical that all application developers ensure their systems comply with Defense Information Infrastructure and Common Operating Environment standards.

Article Highlights

DoD leadership must select a supply management system prudently so that joint warfighters are successful.

In today's uncertain and asymmetric strategic environment there is a requirement, perhaps even an imperative, in the DoD to find the best supply management system that keeps pace with the changing nature of warfare. DoD leadership must select a logistics management system prudently so joint warfighters are successful on the complex battlefields of today and tomorrow. In this article, Newkirk and Currie analyze and compare two major management system options.They use principles from DoD's network-centric warfare concept and lessons learned from Operation Iraqi Freedom as the basis for the analysis. Based on this analysis, they conclude that the DoD should adopt a modified version of the emerging but very powerful GCSS to best meet the logistics management needs of the joint warfighting commander.

Specifically, they conclude the uncertainties and asymmetric nature of today's strategic environment demand a management system that integrates logistics system capabilities and bridges service and agency stovepipes now. Future operations will be conducted in an increasingly joint manner and at a speed unprecedented in the past. The changing nature of warfare requires flexible and adaptive information systems. As a result, waiting 8 years for an unproven system squanders time, money, and possibly lives. Only GCSS-modified can provide combatant commanders and warfighters the capability needed to be successful on the battlefield now and in the future.

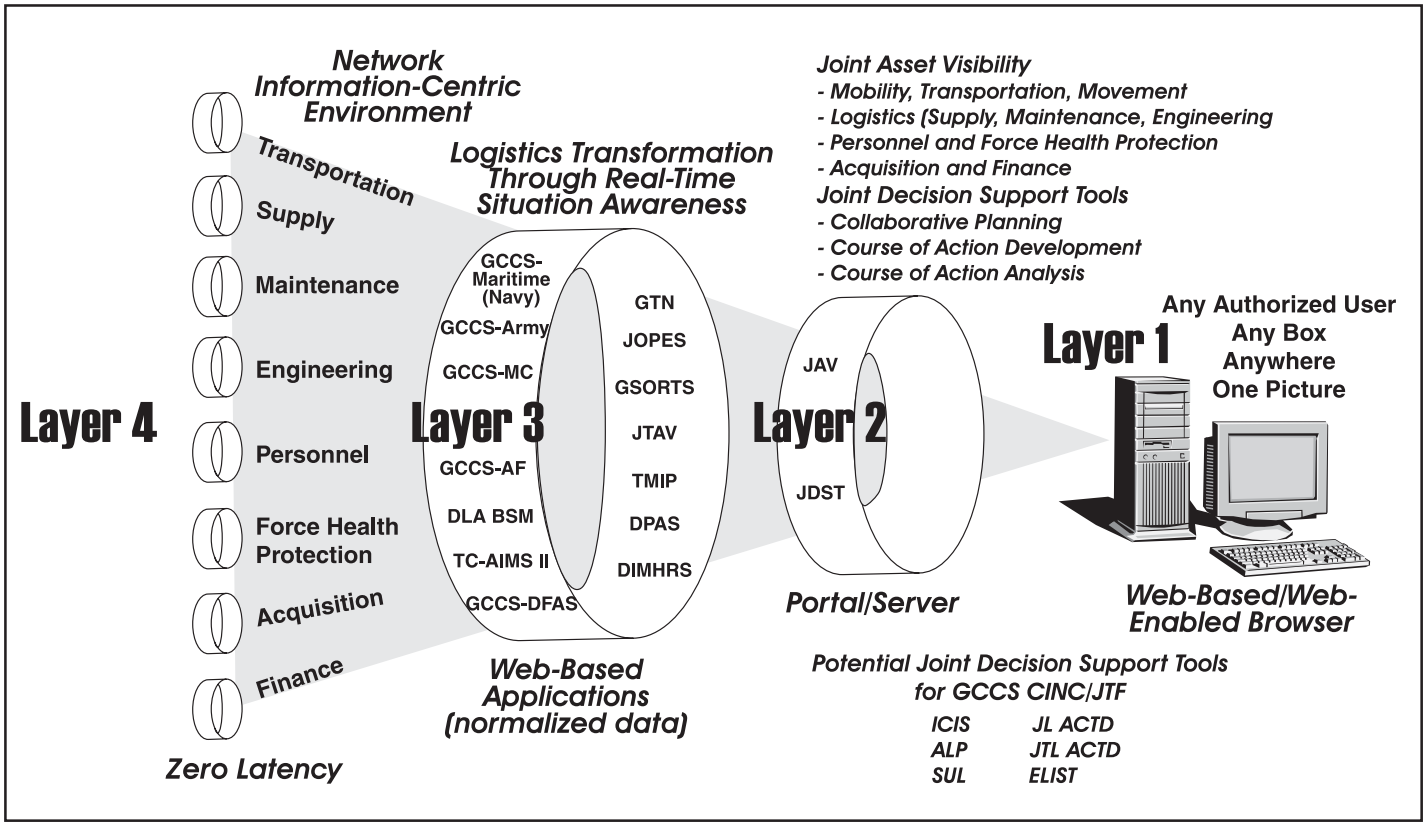


Figure 1. GCSS Concept[15]

To ensure that the Services and agencies are developing a GCSS family of systems that are interoperable and support the overall GCSS architecture, the JSJ4 has mandated that the Services and agencies use Defense Information Infrastructure and other baseline DoD "products, services, standards, and guidelines when migrating or developing software applications, or when upgrading or enhancing existing systems to plug and play into GCSS."[16] Additionally, each service or defense agency is responsible for ensuring that data within its family of systems is real-time and accurate. After all family-of-systems information is integrated and converted into common global asset visibility information in the GCSS server or portal (layer 2), it is sent to worldwide users with GCSS combatant commander terminals (layer 1). This GCSS construct fully meets the OFT asset visibility requirement by allowing any authorized user to access common asset visibility information anytime from any GCSS-combatant commander terminal.

The GCSS meets the second OFT requirement, recommending the most efficient and effective movement of supplies, with Joint Decision Support Tools (JDST). These tools form the cornerstone of the logistics management enterprise and rely on current and emerging systems like Agile Transportation for the 21st Century, Enhanced Logistics Intratheater Support Tool, and Joint Flow and Analysis System for Transportation.[17] They translate the raw data from numerous family-of-system databases into actionable information for battlefield commanders. The JDST projects equipment and unit readiness trends; identifies transportation, supply, and maintenance personnel shortfalls; and recommends how to alleviate those shortfalls.

Logistics data from JDST must be integrated continuously with warfighting operational and intelligence information for the joint commander to make informed supply management decisions. To facilitate this integration, JDST will tie into DoD's emerging global network-centric information infrastructure, the Global Information Grid (GIG). GIG ultimately will serve as the GCSS communications management backbone and act as a key enabler for the increased interoperability of GCSS with other DoD, government, and business entities.[18] Ultimately, JDST will give joint commanders the capability to make timely and informed decisions aimed at improving the readiness of warfighters whether they are in the foxhole, cockpit, ship, or base. With this capability, the JDST component of GCSS meets the OFT requirement to recommend the most effective and efficient move of materials to improve warfighting readiness.

The fourth OFT requirement, ready for immediate use and capable of quick modification, is exceeded easily by GCSS. GCSS JDST and almost all its family of systems are under initial development or undergoing their second and third iteration of modification. This evolutionary state of GCSS is not coincidental as the June 2000 Capstone Requirements Document for GCSS mandated the following developmental criteria.

- GCSS development must be versatile and evolutionary.
- It will follow evolutionary development and acquisition paths.
- The versatile and evolutionary development must be ensured through a modular software design that facilitates modification of the entire GCSS to include its family of systems.
- GCSS modules will be tailored without impacting other modules and the entire system.
- The flexibility of modular software and capabilities of GCSS will be adjusted readily to meet the needs of the warfighter.[19]
- GCSS will leverage commercial technology to optimize logistics processes in DoD while minimizing disruptions.[20]

Finally, the July 2003 *GCSS Enterprise Architecture Overview and Summary* emphasizes that GCSS, in spite of its name, is not a single system but a DoD logistics strategy that will continually build on existing technology, products, procedures, and integration processes in support of the warfighter. Each of the GCSS development standards aligns GCSS so that it meets OFT's requirements for a logistics system that is ready for use now and can be modified to leverage the capabilities of commercial and government technology.

Required GCSS Modifications

The third critical OFT requirement is establishing common logistics objectives and priorities that direct the movement of supplies within the DoD enterprise to meet warfighter requirements. The current GCSS architecture does not meet this requirement. However, three different system modifications would enable GCSS to meet OFT's logistics goals in this area, resulting in a GCSS-modified network.

The first part of the requirement is establishing common logistics objectives and priorities. Because the current GCSS architecture does not accommodate this critical function, GCSS developers must modify GCSS by incorporating a function that allows authorized commanders to integrate common supply priorities and objectives into the GCSS Joint Decision Support Tools. By allowing specified commanders in the GCSS network to enter supply objectives and priorities into the JDST, actionable information from GCSS not only is synchronized with battlefield operations but also is aligned with logistics parameters established by authorized commanders.

The second part of this OFT requirement, a system that triggers the immediate movement of supplies within the network, based on common objectives, requires the second modification to enable commanders to convert actionable JDST information into a GCSS tasking that directs supply and transportation owners to release and move needed supplies immediately after receiving a JDST recommendation. This *tasking tool* modification, combined with the *commander supply objective input* modification, would allow GCSS to meet the OFT system requirement partially that calls for the triggered movement of supplies and transportation assets in accordance with common or shared goals. However, to meet this OFT requirement necessitates a third GCSS modification.

With multiple commanders, from the strategic to the tactical level, using the joint tasking tool and establishing enterprise supply and transportation priorities within the DoD enterprise in an uncoordinated manner, network chaos and conflict are inevitable. For instance, when all four combatant commanders consider their theater a number one priority for the receipt of a scarce high-demand part or equipment item, decisionmakers above the theater level would need to serve as supply management arbitrators to allocate limited strategic transportation and supply resources to a combatant commander's theater based on national priorities. Permanent logistics command and control (C2) nodes would have to be established within the GCSS network from the strategic to the tactical level to deconflict and modify supply and transportation priorities and then adjust unit force activity designators as required.[21] So where should these C2 nodes be located in the GCSS enterprise?

The current GCSS architecture was designed so that almost all actionable information within GCSS is provided to combatant commanders and their staffs on the GCSS-combatant commander terminal (Figure 1, layer). The combatant commanders need much of this actionable information to make many theater-wide operational material distribution management decisions. Although combatant commanders have access to strategic-level logistics information using GCSS, they do not have the time or resources to manage strategic assets outside their theaters. Lieutenant General Zettler, former Air Force Deputy Chief of Staff for Installations and Logistics, confirmed the challenges associated with supporting combatant commanders when there is not a dedicated single entity in the DoD that focuses on managing and prioritizing strategic-level logistics.

> We had combat forces deployed in support of Operations Northern and Southern Watch…we were building up forces in support of Operation Enduring Freedom. At the same time, many continental US-based forces were flying in support of Operation Noble Eagle. Concurrently, we continue our day-to-day vigilance over the skies of South Korea. Arguably, any of these missions could be seen as top priority. However, when everything is priority one, nothing is priority one. Compounding the problem of the number of missions was the fact they crossed all major commands.[22]

To alleviate these logistics prioritization and management challenges, the Secretary of Defense designated the US Transportation Command (TRANSCOM) as the DoD distribution process owner in September 2003. TRANSCOM realizes that the current DoD supply distribution system is a complex conglomerate of optimized stovepipes and bottlenecks, with no one accountable, and understands that its ownership of the distribution process gives it the ability to manage and control supplies and transportation assets across all the Services and agencies in DoD from the factory to the foxhole. Its ultimate goal is to make the current supply distribution process more effective and efficient to optimize support to theater commanders, in accordance with national objectives.[23] Given TRANSCOM's new logistics responsibility within DoD, it makes perfect sense for TRANSCOM to serve as a major logistics C2 node in the GCSS network.

As a major C2 node, all global and strategic supply and transportation management issues would become the TRANSCOM Commander's responsibility. The TRANSCOM Commander would use strategic asset visibility information in GCSS-modified to establish worldwide supply priorities and then direct DoD agencies, using the GCSS tasking tool, to redistribute those supplies. As the owner of the strategic-level C2 node, TRANSCOM could designate other GCSS C2 nodes at the strategic level. These designated strategic-level C2 nodes would establish supply priorities that align with TRANSCOM's overarching supply objectives. Additionally, GCSS C2 nodes designated by TRANSCOM would use the tasking tools on their GCSS-modified strategic terminal to task DoD agencies to reallocate supply and transportation assets within the network. The other major logistics C2 node within the GCSS network should be at the combatant commander's level. Combatant commanders should establish their own supply priorities, but their priorities should align with TRANSCOM's priorities. Similar to TRANSCOM, combatant commanders could allow designated C2 nodes within their theater to establish more specific supply objectives and use tasking tools on their GCSS-modified-combatant commander terminal to reallocate logistics resources within the theater.

Establishment of strategic- and theater-level C2 nodes is an absolutely critical modification to the GCSS architecture because it ensures the thousands of DoD materiel management transactions within the GCSS logistics network are fully integrated and synchronized. This final modification, combined with the two mentioned earlier, enable GCSS to meet the third critical OFT network-centric logistics requirement that calls for establishment of mechanisms that direct the movement of materiel within the network based on common network objectives. Ultimately, these GCSS modifications enable GCSS to meet all four of OFT's critical network-centric logistics requirements. Additionally, this modified version of GCSS would have solved many of the Iraqi Freedom supply management challenges.

Use of GCSS-Modified to Solve Iraqi Freedom Supply Challenges

With the extensive use of systems that relied on information technology during the war in Iraq, many historians may portray Iraqi Freedom as the first information age war.[24] During Iraqi Freedom, joint staffs, using early baseline models of GCSS, had unprecedented asset visibility of critical equipment and supplies in the distribution pipeline between the continental United States and the Iraqi area of operations.[25] In spite of this excellent asset visibility of material flowing into the area of operations, a lack of asset visibility in the theater, intratheater transportation shortfalls, and a consistent inability to predict the daily requirements of the warfighter resulted in widespread shortages of certain supplies and large surpluses of other items in forward units. Additionally, because there was no single system that provided strategic leaders in DoD with asset visibility of common service items, joint staffs took days and sometimes weeks determining how best to redistribute critically short items between the Services and theaters.[26]

What were the supply management and distribution problems during Iraqi Freedom that could have been corrected with GCSS-modified? First, there was no joint supply database that had global asset visibility of all warfighting supplies and equipment in supply depots above the combatant commander level. Additionally, after taking several days to determine the worldwide status of selected supplies, strategic-level logistics commands took a few more days to coordinate the release and movement of the supplies needed to support the combatant commander in the Iraqi area of operations.[27] The TRANSCOM Commander's observations regarding supply distribution at the strategic level during Iraqi Freedom confirm these shortfalls.

> There are too many seams in the supply chain today. If you try to do a chart of all the things that happen, you find a cobweb of networks, each with different technology and cultures. Ultimately, not only TRANSCOM and DLA but also the military services' logistics organizations should be brought under a single command to ensure that warfighters get the same level of service.[28]

Similar supply management challenges occurred during the deployment phase of Iraqi Freedom when the Army had problems ensuring its soldiers deployed with the prescribed number of desert camouflage battle dress uniforms (DCU) and joint service lightweight integrated suit technology (JSLIST). Because of the lack of asset visibility of these common service items, not only within the Army but also across the DoD enterprise, it took weeks for the Army and joint boards on the Joint Chiefs of Staff to make redistribution decisions that would ensure soldiers deployed with the proper number of desert camouflage uniforms.[29]

GCSS-modified would have fixed these Iraqi Freedom logistics problems by giving the TRANSCOM Commander, as the designated GCSS strategic C2 node owner, worldwide visibility of DCUs and JSLIST within the DoD enterprise. The GCSS-modified JDST then would have allowed the TRANSCOM Commander to task units instantaneously to release and transport DCUs and JSLIST to the deployable units that were short these items. This redistribution process, which took weeks during Iraqi Freedom, would have taken hours using GCSS-modified.

The next Iraqi Freedom challenge that could have been corrected with GCSS-modified was the lack of asset visibility of supplies within the theater and recurring shortages and surpluses of supplies within tactical units. OFT and other military officials identified a consistent lack of asset visibility knowledge once supplies and equipment were removed from containers at the ports of debarkation and pushed into distribution pipelines within the theater. Adding to this problem was the lack of reliable communications within combat service support units, which prevented tactical units from transmitting their current and future supply requirements to theater-level supply bases.[30] Because of the theater staff's lack of information regarding daily supply requirements and on-hand quantities in tactical units, theater-level logisticians pushed supplies forward based on their *best guess* of warfighting unit needs. This *best guess* technique for distributing supplies in the theater resulted in supply shortages for some items and unnecessary supply stockpiles of other items at the tactical level.[31]

Additionally, during the Iraqi Freedom ground war, BA-5590 batteries, high-demand batteries used in numerous Marine and Army electronic devices, were projected to become critically short within the Iraqi theater. Tactical Marine and Army units were required to negotiate the local redistribution of these batteries to meet current and short-term requirements. The joint force logistics staff was required to establish a joint common use distribution center to determine authorized stock levels for batteries and direct additional redistribution among service components to meet projected supply demands based on future operational requirements.[32] GCSS-modified would have met these shortfalls by giving the theater J4 asset visibility of all supplies in the theater distribution pipeline and providing redistribution recommendations to task-specific units to release batteries to meet warfighting unit requirements. Ultimately, GCSS-modified would have been far more effective than the *best guess* technique used for distributing supplies during Iraqi Freedom. Moreover, the need for units, Services, and the joint staff to spend hours coordinating to determine BA-5590 battery and other common item distribution and stock-level requirements would have been eliminated with GCSS JDST.

Finally, the lack of robust communications assets to facilitate passing logistics information greatly hindered logistics distribution and management during Iraqi Freedom. The current GCSS architecture fixes this problem by tying into and taking advantage of services in the emerging GIG enterprise. A fully operational GIG would have provided the needed communication management infrastructure that GCSS requires for continuous collaboration among network units. Given GCSS-modified logistics capabilities, one must ask, is GCSS-modified the system that the OFT should adopt to meet DoD's network-centric

logistics requirements, or is there another logistics system in the commercial sector that would do a better job of meeting the requirements?

GCSS-Modified Versus S&RL Commercial Logistics System

To find a baseline logistics management system that best meets DoD's network-centric logistics requirements, the OFT is looking aggressively at the best commercial logistics management systems. It has discovered that numerous large commercial entities are using an S&RL management concept to meet supply management requirements in the network-centric domain. Major commercial entities in the United States, such as the automobile and electronics industries, are using the S&RL concept that originated with IBM.[33] S&RL developers in the OFT are striving to ensure that the S&RL material solution meets all network-centric logistics requirements addressed earlier.

The projected S&RL meets all OFT requirements except one of the developmental requirements (Table 1). Unfortunately, the projected S&RL's inability to meet the requirements of this one criterion causes the current S&RL to not meet any of OFT's network-centric logistics criteria. Because of the significant impact this one criterion has on the overall differences between the GCSS and S&RL options, this section focuses on GCSS' and S&RL's ability to meet OFT's fundamental developmental requirements. Using these fundamental developmental requirements as the criteria for comparing GCSS and S&RL, one is able to determine the superiority of one system over the other.

S&RL's Capability

In its efforts to find a system that meets these foundational developmental requirements, the S&RL team assumes that the best information age logistics management models are in the commercial arena; however, it acknowledges that a single company or technology will not be able to provide the end-to-end solution that DoD needs to meet its network-centric requirements in the logistics domain. Therefore, the S&RL team is adopting a *best of the breed* approach that integrates the best current or future products of a company into the DoD logistics system. By keeping everything modular, components can be added, deleted, or swapped for better or different ones as requirements and technology evolve. To influence current logistics operations, the S&RL team within the OFT is investigating commercial logistics system prototypes. The Marine Corps is scheduled to test the S&RL concept in Sea Viking 04. Additionally, S&RL concepts tests are conducted in Unified Course 04 and Global Engagement VI. As S&RL concept tests conducted during these exercises, Synergy Corporation will continue to engage in its 24-month effort to develop a prototype system.[34] Once this prototype is found, it will be developed with emerging and leading technologies derived from the commercial organizations that produce and use information technology to gain a competitive advantage. The S&RL development team is looking for a logistics system that is flexible enough to be tailored quickly and linked easily to emerging DoD network-centric architectures.[35] The ongoing efforts show that the projected S&RL meets fundamental network-centric logistics developmental requirements one and two; however, these efforts do not come close to meeting the third requirement to be available for immediate use in the DoD.

GCSS Capability

An examination of GCSS developmental efforts leads one to discover that in 1996 GCSS developers also assumed that the best logistics management tools were in the commercial sector. By keeping everything modular, developers easily could integrate the best commercial products into the basic GCSS logistics system. Unlike the S&RL option, GCSS developers already have fielded a basic logistics system in DoD and have been integrating the best commercial and government modular products into the system for the last 3 to 4 years. GCSS has found and fielded numerous prototypes that have been developed rapidly with emerging and leading technologies derived from commercial organizations. These prototypes have been developed using a multitude of Web-based applications and leading technologies associated with the family of systems and the joint decision support tools. Additionally, efforts are ongoing to tie the current version of GCSS into the DoD's GIG to give GCSS the base it needs to support users anywhere in the world.

Whereas the current GCSS meets all the fundamental developmental requirements, the current S&RL meets none of the developmental requirements. The projected GCSS and projected GCSS-modified meet all three developmental criterion, while the projected S&RL meets only two of the three requirements (Table 1).

Even if S&RL developers found a baseline logistics management system comparable to or better than GCSS today, it would take approximately 8 years before that system achieved an initial operating capability within DoD. This 8-year period is the average time it takes a major defense system to move from the *research initiation* phase of the acquisition cycle to the initial operating capacity in the field phase of the cycle.[36] Therefore, the initial fielding of material components for S&RL would not occur until 2012. Thus, the capability rating for the current S&RL in Table 1 would not increase to a number above zero until 2012. Unlike the current S&RL, the current GCSS capability rating in Table 1 would increase to a number greater than ten by 2007 because the current GCSS architecture is projected to be fully operational in 2006.[37]

Clearly, developmental efforts and objectives that S&RL and GCSS developers are using to meet DoD's network-centric requirements are the same, resulting in redundant and inefficient work in DoD. Table 1 shows the redundancy in the projected capabilities of GCSS and S&RL. In spite of efforts to provide the joint warfighter with the same network-centric supply management capabilities and the significant time lag in the acquisition and development of the S&RL option, compared to the GCSS option, the OFT continues to pursue the S&RL option. As S&RL developers conduct additional concept development and research to find the perfect network-centric logistics prototype, time and resources are being wasted.

Consequently, because GCSS developers already have found a suitable network-centric logistics system, the OFT's S&RL development team should terminate its efforts. The OFT, S&RL, and GCSS teams should consolidate efforts so that logisticians in DoD are working toward the common executive goal of modifying and improving the GCSS network-centric logistics system that has proved itself and has tremendous potential for meeting warfighter logistics requirements in the future. This recommendation is in line with Secretary of Defense Donald Rumsfeld's recent testimony implying a need to shift to the GCSS option.

NWC Logistics System / Requirements	Current S&RL	Current GCSS	Projected S&RL	Projected GCSS	Projected GCSS-Modified
A single logistics terminal provides a common Global Asset Visibility picture of all supplies in all services/agencies and in the distribution pipeline.		X	XX	XX	XX
System automatically recommends that supplies be redistributed between supply depots and units based on common supply objectives established by designated network commanders and battlefield conditions.		X	XX	XX	XX
System immediately directs suppliers and transportation units to release and move supplies respectively based on trigger mechanism above.			XX		XX
Fundamental Developmental Requirements					
System continuously leveraging best commercial and government technologies.		XX	XX	XX	XX
System readily modified to integrate the latest technology and achieve interoperability with the emerging DoD information network architecture.		XX	XX	XX	XX
Basic system (current or projected) ready for immediate use in DoD.		XX		XX	XX
Overall Capability Rating (Total Xs)	0	8	10	10	12

XX: System fully meets requirement.
X: System partially meets requirement.
Higher overall capability rating is better.

Table 1. Developmental Requirements

> A different approach is to start with the basics, simpler items, and roll out early models faster—and then add capability to the basic system as they become available. This is what the private sector does—companies bring a new aircraft online for example and then update it over a period of years with new designs and technologies. We need to do the same.[38]

GCSS could be categorized as the basic, simpler item. GCSS is truly an early model of the S&RL prototype that can be *rolled out into DoD* to meet a large percentage of the OFT's network-centric requirements. The modular, adaptive framework of GCSS makes it a prime candidate for updating over a period of years with new designs and technologies. As Rumsfeld stated, "We need to do the same" as the private sector with GCSS. His guidance suggests that DoD logisticians should redirect their energy toward refining the current GCSS. The current version of GCSS that has been fielded across DoD meets approximately 20 percent of the OFT network-centric logistics requirements, whereas the current S&RL meets zero percent of the requirement (Table 1). Additionally, GCSS-modified has a much greater potential for meeting all DoD's network-centric logistics requirements sooner than the projected S&RL system.

Given the Secretary of Defense's guidance regarding the acquisition of major systems in DoD and the analysis and comparison of the S&RL and GCSS options above, the GCSS-modified network-centric logistics system is clearly the best system for the DoD enterprise and the joint warfighter. Therefore, all DoD efforts to provide the warfighter with the best network-centric logistics system should be focused on improving GCSS (the GCSS-modified option) versus finding a better commercial logistics system (the S&RL option). Acquiring a network-centric logistics system that can effectively and efficiently support US forces' network-centric operations could turn out to be the linchpin for the complete transformation of network-centric warfighting forces, which may be needed sooner rather than later.

Conclusion

Finding the supply management tools that will allow the US military to meet the requirements for effective and efficient military supply management is one of DoD's toughest challenges. During Operation Desert Storm in 1991, inefficient and ineffective logistics management caused the buildup of more than 40,000 containers of supplies in intheater seaports. More than half these containers were frustrated at ports because of time-consuming inventories to find out what was in them. To overcome these distribution inefficiencies, warfighting units frequently found substitute items or reordered the supplies, compounding the congested supply pipeline problem.[39]

The baseline GCSS hardware fielded to geographic combatant commanders during 2002 and 2003 fixed many of the asset visibility problems encountered during Operation Iraqi Freedom. Consequently, during Iraqi Freedom, the CENTCOM Commander and the staff had significantly more knowledge regarding the location of critical supplies and equipment moving from the continental United States to the Iraqi theater of operations, giving the theater CENTCOM Logistics Director increased confidence in the supply distribution system. Additionally, this improved asset visibility reduced over-ordering and the *iron mountains* of supplies at ports of debarkation that were prevalent during Desert Storm.[40] However, based on future network-centric warfighting requirements and Iraqi Freedom logistics lessons learned, there are additional critical capabilities that must be incorporated in the defense supply management system to maximize support to the joint warfighter. OFT has developed a thorough list of required capabilities for the new supply management system. Therefore, the current dilemma within the DoD concerns selecting the best system that fully integrates the requirements.

The uncertainties and asymmetric nature of today's strategic environment demand a supply management system that

integrates the OFT supply system capabilities and bridges service and agency stovepipes now. Further, Iraqi Freedom demonstrates that future operations will be conducted in an increasingly joint manner and at a speed unprecedented in the past. Keeping pace with the changing nature of warfare requires flexible and adaptive information systems. Waiting 8 years for an unproven sense and respond logistics system squanders time, money, and possibly lives. GCSS-modified is truly the system that can provide combatant commanders and warfighters with the logistics management capability needed for success on the battlefield, now and in the future.

Notes

1. This definition for logistics supply support is very similar to the Joint Staff J4's definition for Focused Logistics. For more information see "Focused Logistics Campaign Plan," Joint Staff/J4, no date, 4 [Online] Available: http:dtic.mil/jcs/j4/projects/foclog/focusedlogistics.pdf, Nov 03.
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20. "GCSS Capstone Requirements Document," 16.
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23. "Distribution Process Owner Transformation Briefing," US Transportation Command, Oct 03.
24. "Sense and Respond Logistics Capability and Operation Iraqi Freedom," 13.
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27. This information is based on personal observations while working in the Logistics Cell in the Army Operations Center at the Pentagon from Feb to Jun 03.
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30. "Sense and Respond Logistics Capability and Operation Iraqi Freedom," 21.
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32. *Ibid.*
33. "Sense and Respond Logistics: Co-Evolution of An Adaptive Capability, Concept of Operations," 3.
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35. "Sense and Respond Logistics: Co-Evolution of an Adaptive Capability, Concept of Operations," 15.
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38. Erb 80.
39. Hodierne, 16.
40. *Ibid.*

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JL★

notable quotes

Transformation is not a term; it is a philosophy—a predisposition to exploring adaptations of existing and new systems, doctrine, and organizations. It has been part of the Air Force for decades. Transformation is not outlining new programs or things to buy. Rather, it is an approach to developing capabilities and exploring new concepts of operation that allow us to be truly relevant in the era in which we find ourselves, and for years to come.

—Dr James Roche, Secretary of the Air Force

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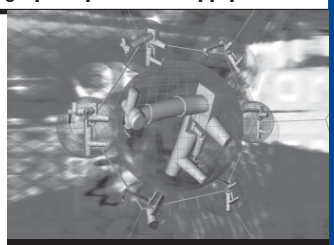
A part grouping system, however, effectively leverages a supply chain by arranging the production of individual items into groups that are based on common manufacturing processes.

Part Grouping

Angioplasty for the Supply Chain

Hey, *loggie* warfighter, your aged weapon systems are full of *tired iron*, you have diminishing manufacturing sources for mission critical spare parts, your industrial base is getting colder, and lead times are getting longer each day. Logistically, you have hardening of the arteries.

Agile Combat Support



Colonel Michael C. Yusi, USAF

The Editorial Advisory Board selected "Part Grouping"—written by Colonel Michael C. Yusi, USAF, Vol XXVII, No 1—as the most significant article to appear in the *Air Force Journal of Logistics* in 2003.

The Japanese were not the first to ignore the importance and vulnerability of logistics.

Oil Logistics

In the Pacific War

Lieutenant Colonel
Patrick H. Donovan, USAF

As long ago as 1187, history shows that logistics played a key part in the Muslim's victory over the Crusaders at the Battle of Hittin. The Muslim commander Saladin captured the only water source on the battlefield and denied its use to the Crusaders.

The Editorial Advisory Board selected "Oil Logistics in the Pacific War"—written by Lieutenant Colonel Patrick H. Donovan, USAF—as the most significant article to appear in Vol XXVIII, No 1 of the *Air Force Journal of Logistics*.

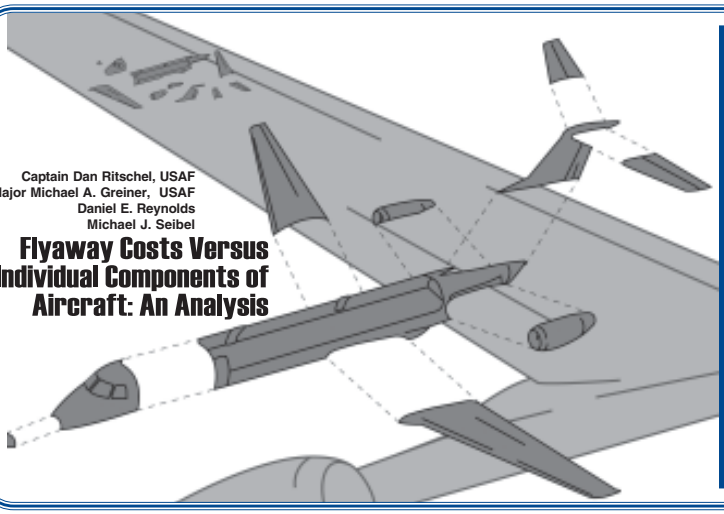
Lieutenant Colonel Joseph E. Diana, USAF

Improving Bare-Base Agile Combat Support

A Comparative Analysis Between Land Basing and Afloat Prepositioning of Bare-Base Support Equipment

To improve Air Force agility in establishing bare-base operations, RAND and the Air Force Logistics Management Agency analyzed current conditions separately and recommended potential solutions.

The Editorial Advisory Board selected "Improving Bare-Base Agile Combat Support: A Comparative Analysis Between Land Basing and Afloat Prepostioning of Bare-Base Support Equipment"—written by Lieutenant Colonel Joseph E. Diana, USAF—as the most significant article to appear in Vol XXVIII, No 2 of the *Air Force Journal of Logistics*.



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Flyaway Costs Versus Individual Components of Aircraft: An Analysis

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